

ABSTRACT

The invention relates to light polarizers and devices for displaying information based on said polarizers, in particular to a liquid crystal indicating (LCI) element, and can be used in flat liquid-crystal displays, including those of the projection type, luminaires, optical modulators, matrix systems of light modulation, etc.

The objective of the invention is to provide an highly efficient polarizer providing an improved brightness and colour saturation of a LCI element based on such polarizer.

This objective is to be attained by using, in manufacture of a polarizer and a LCI element based on such polarizer, at least one birefringent anisotropically absorbing layer having at least one refraction index that grows as the polarized light wavelength increases, i.e. having the abnormal dispersion.

The use of said layer allows to create polarizers of both the dichroic and interference types. Further, the use of said layer allows to create a polarizer that provides, in a relatively simple design, conversion of practically all energy of a non-polarized radiation into the polarized radiation.

The above-recited peculiarities of the claimed polarizer based on a birefringent anisotropically absorbing layer having the abnormal dispersion allow to create both a colour and monochromic LCI element distinguished for an higher brightness, colour saturation, good angular characteristics and absence of shadows.

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LIST

of reference numerals and designations of elements shown in drawings

- 1 - birefringent layer
- 2; 29 - component of incident light, linearly-polarized in the pattern plane
- 3; 4; 12 - component of reflected light, linearly-polarized in the pattern plane
- 5 - component of incident light, linearly-polarized perpendicularly to the pattern plane
- 6; 7 - component of reflected light, linearly-polarized perpendicularly to the pattern plane
- 8; 9; 10 - graphs of refraction index against light wavelength
- 11; 30; 31; 32 - isotropic layer
- 14; 41 - non-polarized ray (incident or passing)
- 15 - lenses of a birefringent material
- 16; 33 - conventional designation of the optical axis of a birefringent layer
- 17; 13; 20; 36 - component of passing light, linearly-polarized perpendicularly to the pattern plane
- 18; 23; 22 - component of passing light, linearly-polarized in the pattern plane
- 19; 21 - sections of half-wave phase-delaying plates
- 24 - amplitude zone plate
- 25; 26 - sections of a quarter-wave phase-delaying plate
- 28; 28 - circular-polarized passing light
- 34; 35 - surface profile boundary of dielectric layers of the phase zone plate
- 37 - metallic mirror
- 38 - lenses of an isotropic material
- 39 - layer of cholesteric LC
- 40 - circular-polarized reflected light
- 42 - polarizing means for dividing non-polarized light into the passing and linearly-polarized components (one-layer or multi-layer means)
- 43 - microprisms
- 44- 44; 45 - walls of LC cell (substrate)
- 45- 46; 47 - electrodes in a LC cell
- 48; 49 - insulating films in LCI
- 50; 51; 56 - dichroic polarizer in LC cell
- 52 - layer of nematic LC in LC cell
- 53; 54 - orienting layer in LC cell
- 55 - reflecting layer in LC cell
- 57 - colour matrix in LCI

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